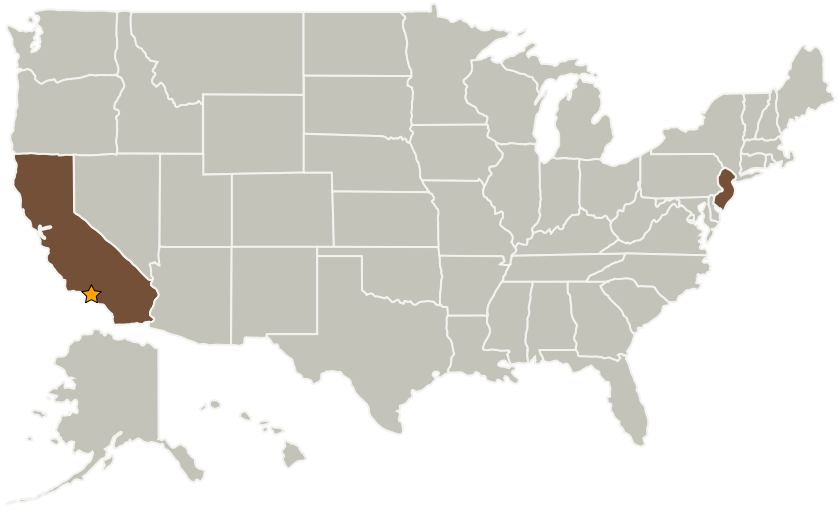
Low Permeation Envelope Material Development for Titan Aerobot, Phase II

Completed Technology Project (2004 - 2006)

Project Introduction

Aerobot vehicles for missions on Titan require envelope materials that are strong, light and durable. In particular they must be able to withstand flexing at liquid nitrogen temperatures (77K) without developing pinhole gas leaks. To meet this requirement, it was proposed that a multiple layer laminate of thin PET films would be better than an equivalent thickness single layer of the same film. In the Phase I work, some of the laminating variables were studied. Through this effort, significant improvements in the material for Titan aerobot use were realized. The cold temperature flex durability against pinhole failure was increase by 70% due to changes in the weave counts of the fabric. Tests also demonstrated that a 50% reduction could be made in the adhesive weight used to laminate the films without sacrificing bond or flex durability. This Phase II proposal is for continued development of the Titan aerobot envelope material based on the results of Phase I. Since materials must function as part of a product the proposal also is to begin testing of seaming methods for the material and to prove the results by fabrication of an actual aerobot envelope for pressure testing and possible flight demonstration.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
Lamart Corporation	Supporting Organization	Industry	Clifton, New Jersey

Primary U.S. Work Locations	
California	New Jersey

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX14 Thermal Management Systems
  - TX14.3 Thermal Protection Components and Systems
    - TX14.3.1 Thermal Protection Materials